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A Descriptive study of critical thinking abilities of nursing students and registered nurses

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A DESCRIPTIVE STUDY OF CRITICAL THINKING ABILITIES OF NURSING STUDENTS AND REGISTERED NURSES

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By

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ABSTRACT

A DESCRIPTIVE STUDY OF
CRITICAL THINKING ABILITIES
OF NURSING STUDENTS
AND REGISTERED NURSES

by Nancy D. Bingaman

The purpose of this descriptive study was to explore critical thinking abilities among nursing students at various levels of their education and registered nurses. Research questions identified levels of students' thinking abilities, differences at various educational levels, and differences between student groups and registered nurses. The critical thinking theory provided the conceptual framework for this study. The Watson-Glaser Critical Thinking Appraisal and a demographic instrument were used. The sample population consisted of 89 nursing students in an associate degree program and 28 registered nurses (N=117). Data were analyzed using percentages, means, standard deviations, ranges, and t-tests.

Findings reveal statistically significant differences in mean critical thinking scores between registered nurses and all student groups. Recommendations include arriving at a consensus regarding the definition of critical thinking and providing specific measurement of critical thinking in nursing practice.

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Chapter 1

INTRODUCTION

This study focused on describing nursing students' critical thinking abilities. The study analyzed the differences in critical thinking abilities between nursing students at different educational levels. It also described the critical thinking abilities of registered nurses. Investigating the levels of critical thinking is groundwork to facilitating the development of critical thinking skills necessary in today's complex health care environment.

Critical thinking is the ability to use knowledge to rationally examine and analyze ideas, facts, principles, theories, abstractions, deductions, inferences, assumptions, interpretations, issues, statements, beliefs, actions, and the evaluation of arguments (Bandman & Bandman, 1988; Brooks & Sheperd, 1990). McPeck (1990) states there are certain essential components of critical thinking. These components are reasoning ability, reflective skepticism, exploring, and imagining alternatives. Critical thinking is a process of challenging rules to reflect on new possibilities and explanations. Critical thinking does not remain in the domain of concrete answers, or one right answer, but moves beyond to the possibility of many acceptable solutions (Jones & Brown, 1991).

Nursing leaders state that with the diversity and

complexity in nursing practice, it is necessary to prepare nurses to think critically and creatively (American Association of Colleges of Nursing, 1986). It is increasingly important for nurses to master thinking and reasoning skills to process and evaluate both current and future information (Schank, 1990).

The critical thinking skills necessary to practice nursing in today's health care system must be assessed and evaluated during the students' nursing education (White, Beardslee, Peters & Supples, 1990). The National League for Nursing (1983) requires schools to provide evidence of curricular content and teaching strategies that will enhance the students' critical thinking, decision making, and independent judgement.

Background

Nurses continue to formulate a unique body of knowledge, which is separate and distinct from that of the medical model (Jones & Brown, 1991). In the past nursing leaders favored the scientific method as the only reliable and legitimate method to observe and understand the world. Therefore, the nursing process, which was developed in the 1960s, became the preferred method of acquiring nursing knowledge (Jones & Brown, 1991). More recently nursing researchers began to examine the underlying assumptions of the nursing process and its purpose in explaining nursing

knowledge (Hagell, 1989). Researchers see that the nursing process is more centered on patients' reactions to altered health. And through attention to these human reactions, the nursing process promotes such critical thinking activities as rationalizing, reflecting, and reasoning in addition to what we traditionally think of as the scientific method (Jones & Brown, 1991).

When nursing students of the past were trained, they were given pages of facts and concepts and expected to memorize them. This rote learning and blind absorption of others' thoughts, beliefs, and skills was restrictive and caused the students to be passive and dependent (Burnard, 1989).

However, as nursing practice develops into a more complex and specialized profession there is a demand and need to not only train nurses but to educate them as well. "Education suggests an evolving, critical process which enables the learner to make decisions for themselves through the exercise of rational thought" (Burnard, 1981, p. 271). In this definition, education encourages learners to think, be active, and be independent. Nurses who think clearly and critically can act with autonomy to care for clients in diverse medical and ethical situations (Burnard, 1989).

Pardue (1987) indicates that "to function in today's complex health care system, nurses need both a broad

knowledge base and mastery of intervention skills to be able to deliver high quality, fiscally responsible patient care" (p. 354). Regardless of the health care setting, a key component of nursing practice is the nurse's cognitive abilities, especially the nurse's ability to process information and make decisions (Pardue, 1987). Nursing educators often think of skills as psychomotor rather than cognitive; however, cognitive skills are the hallmark of an educated person and are critical for today's nursing role (Miller & Malcolm, 1990).

The education of nurses is of prime importance at this time because there is a great need for quality health care delivery. Not only are numbers of nurses needed, but the current economic situation in health care makes productivity and excellence imperative. This is supported by the reports of nursing shortages; according to a 1988 report, many hospitals had a 39% shortage of professional nurses at that time (Allen, Higgs & Holloway, 1988).

In 1988, the Fifth Report on the Status of Health Personnel in the United States was presented to the President and Congress. This report projected that between the years 1990 and 2000 there will be only half the required number of bachelor's and master's prepared nurses necessary to fill the vacancies (Allen, Higgs & Holloway, 1988). Currently there are 120,000 nurses needed nationwide, and if

this trend continues approximately 600,000 nurses will be needed by the year 2000 (Bliesmer & Eggenberger, 1989). Although this projection may be offset somewhat by current downsizing trends, the need for excellent, versatile nurses will probably continue.

The American Association of Colleges of Nursing's 1988 study reveals a decrease in national enrollments (Donovan, 1989). Decreases in enrollment are due to several factors, which include other career opportunities for women, false or limited information about nursing, and a decline in the image of nursing. Many of the students applying and enrolling in nursing schools today have lower grade point averages (GPA), lower Scholastic Aptitude Tests scores (SAT), and poorer critical thinking abilities than in the past (Allen, Higgs & Holloway, 1988). These factors are characteristics of high-risk students who are more likely to experience academic failure and drop out of nursing school (Donovan, 1989; Hudepohl & Reed, 1984; Reed & Hudepohl, 1985).

Once students enroll in the nursing school, the focus shifts to retaining the students, preventing attrition, and supporting their academic success (Rosenfeld, 1988). The first step in successful retention is knowing the type of students enrolled. A student assessment provides a profile of each student. This information pin-points the high-risk

students, those with low GPAs, low SAT scores, and poor critical thinking abilities. If a method could be implemented to assess these areas either prior to entrance or shortly there after, remediation and counseling could begin immediately (Donovan, 1989).

This study's broad purpose is to further understand nurses' critical thinking abilities, as a component of their education and nursing practice. Specifically this study analyzes the critical thinking abilities of registered nurses and nursing students at different educational levels.

Problem Statement

Although there is a vast amount of information in the literature on critical thinking, the definitions of critical thinking are unclear. Nationwide, educators articulate the need to educate students in critical thinking abilities (McMillan, 1987). In nursing practice, administrators and managers appeal for nurses with critical thinking ability. Critical thinkers are needed to function in an impacted health care system (Schank, 1990). Within nursing education, the faculty are bound by regulations to produce registered nurses who possess critical thinking abilities (National League for Nursing, 1983). Yet there is no consensus among faculty that this overall goal of facilitating critical thinking abilities is met.

Research Questions

This study seeks to answer the following research questions:

1. What is the level of nursing students' and registered nurses' critical thinking abilities?

2. Is there a difference between critical thinking abilities of nursing students at different levels of their program?

3. Is there a difference in critical thinking abilities between registered nurses and student nurses?

Purpose

The purpose of this study is to explore critical thinking abilities of nursing students in an associate degree program and registered nurses. More specifically the purpose is to: (a) describe the critical thinking abilities of nursing students at various levels of their education, (b) describe the critical thinking abilities of registered nurses, and (c) describe differences in critical thinking abilities between these groups.

The lack of clear definitions of critical thinking and lack of consensus between nursing faculty suggests a need for research on this issue. This study aims to more clearly define critical thinking abilities as they apply to nursing practice and nursing education.

Definition of Terms

For the purpose of this study the following terms will be used:

1. Critical thinking is the ability to use knowledge to logically examine, analyze, and evaluate ideas, facts, theories, inferences, assumptions, beliefs, and arguments (Bandman & Bandman, 1988; Brooks & Shepard, 1990).

2. Registered nurse is a person who possesses a license to practice as a registered nurse in the state of California and has graduated from an accredited school of nursing.

3. Student nurse is a person beginning or currently enrolled in a school of nursing approved by the California Board of Registered Nursing.

Summary

Critical thinking is essential for sound clinical judgement. Students need to demonstrate critical thinking to graduate from nursing school and successfully pass the National Council Licensing Examination (NCLEX). Prenursing students entering college with little experience in critical thinking can enhance skills through a specially designed curriculum. This study examined the issue of critical thinking abilities. Specifically, it described the differences in critical thinking abilities between nursing students at various levels and registered nurses in current practice.

Chapter 2

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

Conceptual Framework

Critical thinking theory provides the conceptual framework for this study. Yinger (1980) states that critical thinking may be viewed in general terms where thinking processes are reflective, organized, and allow responses after thought occurs; or more specifically, critical thinking is associated with problem solving, creative thinking, or decision making. Conceptually, critical thinking is a unique cognitive process which comprehensively employs reflective reasoning to arrive at explanations (Ennis, 1985). Critical thinking is an interdisciplinary theory that draws its concepts from studies of philosophy, education, learning, developmental psychology, and cognitivism (Jones & Brown, 1991).

Critical thinking allows the presentation of different points of view. Critical thinking theory recognizes that the individuality of independent thought is basic to learning (McPeck, 1981). It recognizes the importance of higher-order thinking wherein learning occurs as the result of progressing toward a conclusion rather than accepting someone else's conclusion on the subject (Paul, 1984).

The Watson-Glaser Critical Thinking Appraisal is based on a conceptualization of critical thinking developed by

Dressel and Mayhew (1954). Bauwens and Gerhard (1987) describe critical thinking as the ability to: (a) define a problem, (b) select important information for problem solving, (c) recognize stated and unstated assumptions, (d) formulate or select relevant and possible hypotheses, and (e) draw valid conclusions and judge soundness of inferences.

Watson and Glaser (1964) also conceptualized critical thinking as a composite of attitudes, knowledge, and skills. Attitude is the frame of mind, involving inquiry that encompasses the ability to recognize the existence of problems, and a need to gather evidence to support that which is asserted to be true. Knowledge involves weighing the accuracy and logic of the evidence gathered, in other words, an understanding of the nature of valid inferences, abstractions, and generalizations. Skill is then employed to apply the attitudes and knowledge that are acquired in this process (Bauwens & Gerhard, 1987; Miller & Malcolm, 1990). Miller and Malcolm (1990) support the conceptualization utilized by Watson and Glaser as the most useful in nursing since there is a practice focus in nursing education.

Certain component parts of critical thinking are considered essential to this cognitive process: (a) reflective skepticism, (b) exploring and imagining

alternatives, and (c) awareness of the context of the situation (Meyers, 1986).

Reflective skepticism or questioning is the process of reviewing the argument or facts presented and comparing them with one's own experience and knowledge. This process allows analysis of the facts in reference to one's previous experiences so that judgement on alternatives may be accomplished. This ability to reflect on how decisions are reached increases the possibility that unique and creative solutions can be found (Saylor, 1990).

Exploring and imagining alternatives is the ability to investigate a variety of solutions. One uses the thinking process to symbolically explore the possible solutions that relate to the goals and systematically use that information to arrive at a decision (Berger, 1984). Imagining on the other hand, "is the reorganization of symbolic past experiences without accuracy or regard for form or direction" (Berger, 1984, p. 306).

Awareness of the context of the situation is one's ability to perceive and understand the given conditions or circumstances under which a particular conflict has arisen (Paul, 1984). The specific context of the problem will help to determine acceptable solutions to thinking and resolution (Meyers, 1986).

Review of Literature

The literature is abundant with studies on the need for developing critical thinking skills among college students as well as nurses (Ennis, 1985, 1990; Facione, 1986; Malaek, 1986; Miller & Malcolm, 1990; Pond, Bradshaw, & Turner, 1991). The following review of literature will describe five areas of research: (a) critical thinking issues, (b) critical thinking in education, (c) attrition related to critical thinking, (d) critical thinking and clinical decisions, and (e) nursing education studies in critical thinking.

Critical Thinking Issues

McMillan (1987) in his research reviewed 27 studies related to critical thinking in college students. The studies demonstrate a lack of support for the use of specific instructional or course conditions to enhance critical thinking abilities; however, they did support the conclusion that college attendance improves critical thinking ability. The study concluded that the research lacks a common definition of critical thinking (McMillan, 1987).

Miller and Malcolm (1990) identified the increasing emphasis on critical thinking, especially in nursing curricula. They seek to keep critical thinking "as an attitude of inquiry, supported by knowledge base and

enhanced by skill in application" (p. 73) and not let it become another unit of content to be included. They encourage students and faculty to use critical thinking to seek more effective answers, even though they do not suggest any easy formula to guide the development of these skills.

Tanner (1986) used the Delphi survey technique to question 121 nurse educators about priorities for future nursing research. The development of problem solving skills ranked second in the survey. Tanner identified the need for problem solving skills in the clinical setting and some specific teaching strategies to enhance problem solving skills.

Critical Thinking in Education

Facione (1986) discussed the problem of testing college-level critical thinking. He first sought a definition of critical thinking then broke the skill into distinct subskills: construction of argument, evaluation of arguments, identification of arguments, and distinction of arguments from emotional appeals. He stated that testing can be validly and reliably conducted on college students with a machine-graded multiple-choice instrument. The research also stressed the urgent need to provide high quality instruction in critical thinking.

Norris (1987) also discussed the question of validity in testing critical thinking. The author outlined

procedures to increase the validity of multiple-choice critical thinking tests. The research suggested that multiple-choice tests cannot test all aspects of critical thinking, but improving multiple-choice tests where applicable can have important practical and scientific implications.

Kurfiss (1988) used Perry's model of intellectual development to describe the thinking levels: (a) dualism, (b) multiplicity, (c) relativism, and (d) commitment in relativism. She described the relationship of critical thinking to these levels. The students who did not learn the basic skills of critical thinking, did not move beyond the level of multiplicity. Kurfiss suggested that educators study the developmental theories to better facilitate their students' critical thinking abilities.

Ennis (1985) expanded the definition of critical thinking to include "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45). He stated that higher-order thinking skills, like Bloom's taxonomy describes, are too vague to guide development of critical thinking. Instead, Ennis listed dispositions and abilities that constitute critical thinking: clarity-related abilities, inference-related abilities, decision making abilities, and problem solving abilities. Ennis also stated that this analysis of critical thinking abilities is the

foundation for multiple-choice, large scale critical thinking assessments nationwide.

White, et al., (1990) suggested educators be accountable for including and evaluating curriculum elements which promote critical thinking skills. "In an era of educational accountability, all fields of higher education must examine and justify their curricula in terms of producing graduates who can think critically and make appropriate decisions" (p. 16).

Paul (1984) stated that critical thinking theory recognizes the importance of higher-order thinking to substantive learning. Learning occurs as one progresses toward a conclusion rather than accepting other's solutions.

Attrition related to Critical Thinking

There is considerable research in the area of developing predictive criteria for students who will be successful in education (Alichnie & Bellucci, 1981; Lindop, 1987, 1988, 1989; Marshall, 1989; McDonald et al., 1983). Many of the students applying and enrolling in nursing schools have lower grade point averages (GPA), lower Scholastic Aptitude Test scores (SAT), and lower critical thinking abilities than in past years (Allen, Higgs & Holloway, 1988). These are the characteristics of a high-risk student who is more likely to experience academic failure and drop-out of nursing school (Donovan, 1989;

Hudepohl & Reed, 1984; Reed & Hudepohl, 1985). Owens and Feldusen (1970) identified an urgent need to improve the prediction of academic success in nursing education. They cite a one-third attrition rate from nursing schools which continues to be the average today (Miller & Malcolm, 1990).

Montgomery and Palmer (1976) also found a one-third drop-out rate in associate degree nursing programs. This high attrition rate is not only costly in terms of student and faculty time and energy, but the emotional cost to the student is significant.

Munro's (1980) study of drop-outs from nursing education investigated academic and social integration of the student. Her study did not conclusively pinpoint a single factor which influenced attrition.

Yess (1980), a director of continuing education at a community college, cited an open-door admissions policy as a problem. The open-door policy permitted any student who successfully completed the prerequisites to enroll in the nursing program. After looking at 15 variables, Yess found "math SAT scores to be the single most important predictor of nursing education success...furthermore faculty believe the mathematical aptitude plays an important role in the student's ability to analyze and apply scientific principles" (p. 23).

Critical Thinking and Clinical Decisions

The literature contains many studies that relate critical thinking abilities to the ability to make clinical decisions (Jenkins, 1985; Pardue, 1987; Wong, 1979). Some of the researchers call this decision making ability clinical judgement or clinical proficiency (Fitzpatrick, 1990; Shepard, 1990). Many studies suggested that nursing education needs to focus on its impact upon critical thinking and clinical judgement (Bauwens & Gerhardt, 1987; Kintegen-Andrews, 1991; Sullivan, 1987).

In 1979, Wong investigated nursing students' inability to transfer classroom learning to clinical practice. She described the problem as an inability to solve problems in nursing situations. Wong described other learning problems, such as lack of motivation and difficulties related to problem solving ability.

Jenkins (1985) investigated clinical decision making among nurses. She urged nurse educators to improve clinical decision making in their students. She proposed that the nursing process is a rational process and, therefore, is the theoretical basis for decision making. To improve decision making, students should be encouraged to critically analyze situations.

Tanner (1986, 1990) did extensive research on clinical judgement. She indicated that the nursing process, as an

analytic problem solving activity, is the most important tool for clinical reasoning. She encouraged incorporating nursing process into nursing curricula. She also supported the assumption that care plan writing is the most effective way to teach clinical reasoning and problem solving.

The National League for Nursing outcome criteria (1983) listed critical thinking as one of the skills needed by students. This included the ability to reason, analyze, research, and make decisions relevant in nursing practice. The National League for Nursing specifically included critical thinking ability as an entry level competency in clinical judgement.

Frisch (1987) evaluated the intellectual development and critical thinking of nursing students at the junior level of a baccalaureate program. She used Perry's thinking stages of dualism, multiplism, and relativism as an organizing framework. She found most junior students to be at the dualism level. Even at graduation, few had progressed to the multiplism level.

In research on levels of clinical competency known as novice to expert, Benner (1984) encouraged those moving through these levels of proficiency to practice decision making games and simulations that would improve their skills. These exercises help in planning and coordinating multiple, complex client care demands.

Pardue (1987) investigated the differences in critical thinking and decision making skills among associate degree, diploma, baccalaureate, and master's prepared nurses. Using the Watson-Glaser Critical Thinking Appraisal (WGCTA), baccalaureate and master's prepared nurses had the highest scores in critical thinking ability. Pardue also investigated decision making skills, using an instrument she developed for this study. The instrument was based on eight domains and 44 competencies of nursing practice identified by Benner (1984). No significant differences were found among the four groups related to these decision making skills. Pardue did find experience and knowledge were the most influential factors in decision making.

Brooks and Shepherd (1990) studied the relationship between clinical decision making skills and critical thinking skills of senior nursing students in four types of nursing education programs (associate degree, diploma, generic baccalaureate, and RN completion of upper division baccalaureate). They used the WGCTA to determine critical thinking scores and the Nursing Performance Simulation Instrument to measure clinical decision making ability. The critical thinking scores of senior generic baccalaureate students were higher than associate or diploma program seniors. No significant difference was shown in clinical decision making among these three groups. Upper division

RNs' critical thinking ability was comparable to generic baccalaureate seniors; however, their mean clinical decision making scores were significantly higher than the other three groups. A particularly useful finding was a weak though statistically significant positive correlation (r =.249, p <.05) between critical thinking and clinical decision making in all four groups.

Fitzpatrick (1990) focused on the ways to enhance nursing knowledge and clinical judgement. Among her many suggestions, she encouraged nursing education to place a strong emphasis on development of critical thinking. She felt placing great importance on critical thinking should improve the students' discrimination of data in their clinical judgements.

Harbison (1991) focused on the need to develop critical thinking ability, particularly in relation to clinical decision making. She supported the view that nursing is a complex activity developed to sustain people in every aspect of their lives. She also advocated that reflective practitioners should use both analytical and intuitive processes to guide their clinical decision making.

Kintgen-Andrews (1991) conducted an analysis of relevant studies in the nursing literature to focus on: (a) nursing education's impact on critical thinking, (b) nursing education's impact on clinical judgement,

(c) the relationship of critical thinking and clinical judgement, and (d) the relationship of critical thinking and achievement in nursing education. Though her findings were mixed, there was a strong argument for the emphasis of generic critical thinking skills among nursing students as a basis for clinical judgement.

Nursing Education Studies in Critical Thinking

Nursing literature contains several studies of critical thinking, all of which used the Watson-Glaser Critical Thinking Appraisal (WGCTA). Berger (1984) assessed 137 sophomore baccalaureate nursing students and 74 liberal arts students with the WGCTA. Each group was assessed at the beginning and end of their education. She used the Pearson product moment coefficient to measure relationships between critical thinking ability and grade point average (GPA) in either nursing or science courses. She found no statistically significant relationships. However, she did find that nursing students had higher critical thinking ability scores than liberal arts students. A second finding was that nursing students' critical thinking scores increased significantly during their nursing program.

Bauwens and Gerhard (1987) used the WGCTA to predict success of students in a baccalaureate nursing program. The 2 year longitudinal study administered the WGCTA during the first semester and last semester of nursing school. A

Pearson product moment coefficient between the first testing and NCLEX score was r =.31, p =.002. There were no statistically significant changes in the total Watson-Glaser scores from first to last semesters. A multiple regression analysis demonstrated that the first semester Watson-Glaser scores and entry GPAs together accounted for 15% of the variance in NCLEX scores (p=.001).

Gross, Takazawa, and Rose (1987) also collected entry and exit WGCTA data from associate degree and baccalaureate nursing students. These students were also given the National League for Nursing (NLN) pre-admission exam. The NLN score was positively related to the WGCTA entry and exit scores (r= .28 and .24 respectively, p <.05). Interestingly both groups had similar critical thinking scores on the entry WGCTA (associate degree = 44.5 and baccalaureate = 45.6). Both groups showed statistically significant increases between entry and exit WGCTA scores (p <.01). For the baccalaureate group, multiple regression analysis showed that WGCTA scores predicted performance on the NCLEX; however, GPA remained the best predictor of NCLEX.

Sullivan (1987) studied RNs returning to school to earn baccalaureate degrees. She assessed their critical thinking ability (WGCTA), creative thinking (Torrence Test of Creative Thinking), and clinical performance (Stewart Evaluation of Nursing Scale). Each of the three tests were

administered in the first and last semester. From the first tests until the second there were significant gains in the students' GPA and clinical performance. There were significant losses in their originality and creativity, as measured on the Torrence Test of Creative Thinking. However, there were no significant differences in their critical thinking abilities.

Miller (1987) examined the impact of baccalaureate nursing education on critical thinking. The WGCTA was administered on entry and exit with a statistically significant gain on t tests (p =.05). Subscale gains were significant (p =.05) on recognition of assumptions and deductions. Correlation analysis revealed a statistically significant relationship (p =.05) between nursing GPA and post-test total scores. However, using a multiple regression analysis, GPA and post-test scores only accounted for a variance of 4%, not a powerful predictor.

Ircink-Waite (1989) collected data from 11 baccalaureate nursing programs in Wisconsin. She used the WGCTA to measure critical thinking abilities of senior nursing students. The results indicated no statistically significant relationship between the three curricular models employed at these schools and critical thinking scores. Using analysis of variance, no statistically significant differences on critical thinking scores were noted between

age, gender, years of work experience, or education groups. There was a positive statistically significant relationship found between GPA and critical thinking scores.

Kokinda (1989) measured critical thinking abilities among baccalaureate nursing students. She tested students at four levels of nursing education with the WGCTA. An analysis of variance indicated a statistically significant difference between mean scores at the different levels of education. Statistically significant differences among the four levels were noted in subscales scores of inference, deduction, and evaluation of arguments. A Pearson product moment correlation coefficient revealed a significant positive relationship between critical thinking and grade point average.

Brigham (1989) investigated the differences among nursing students at four levels in a baccalaureate nursing program. No statistically significant differences were found among the four grade levels in critical thinking abilities on the WGCTA using analysis of variance ($F = 2.50$, $p = .06$). SAT verbal scores, grade point average, humanities grades, and fine arts grades were entered in a regression equation to collectively account for 41% of the variance in critical thinking ($p = .001$).

Poole (1989) assessed associate degree and baccalaureate nursing students to see if their critical

thinking abilities increased as they progressed through their respective programs. Students in both programs showed an increase in the high cognitive dimension of critical thinking. There were no changes in either program in the low cognitive dimension. These findings need better validation, as they are inconsistent with traditional nursing education methods which considered the teaching of the nursing process to foster low cognitive, logical rather than high cognitive, creative thinking.

Summary

The studies reviewed thus far only begin to answer the questions related to nursing students' critical thinking abilities. The findings underlie the importance of critical thinking in professional nursing, but lack clarity of definition as to what elements constitute critical thinking (Jones & Brown, 1991; Kokinda, 1989). Also lacking is an indication of curricular content or teaching strategies which could increase critical thinking abilities (Brigham, 1989). Of the studies using the WGCTA, some show conflicting findings in regards to whether or not nursing education increases critical thinking abilities (Bauwens & Brigham, 1989; Gerhard, 1987; Gross, Takazawa & Rose, 1987; Sullivan, 1987).

Chapter 3

METHODOLOGY

This chapter describes the research design, sample, setting, data collection, instrument, measurements, and data analysis used in the study. The goal is to describe differences in scores on critical thinking tests among nursing students at three different levels of nursing education and registered nurses.

Research Design

The design was a nonexperimental, cross-sectional study based on the scores achieved by both students and registered nurses on the Watson-Glaser Critical Thinking Appraisal. This method examines data collected at one point in time with the same subjects or different cohort groups (LoBiondo-Wood & Haber, 1986). Standardized instruments are useful because there is less question of their validity and reliability. The tests are also accompanied by norms that allow the investigator to evaluate the results (Oyster, Hanten & Llorens, 1987).

The advantages of this methodology are that it is less time consuming and less costly than personal interviews. A cross-sectional examination is usually more effective, efficient, and manageable with less subject mortality due to attrition (LoBiondo-Wood & Haber, 1986). Large amounts of data can be collected in a relatively short period of time.

Using this method allows fewer confounding variables due to maturation (LoBiondo-Wood & Haber, 1986). Subjects can remain anonymous and an interview bias should not be present (Polit & Hungler, 1983).

The disadvantages of this method are that a voluntary testing session may have a low participation rate. The method of attracting participants may appeal to the more critical thinkers in the population, which may produce a biased sample.

Sample and Setting

The sample population for this study consisted of two groups: (a) local associate degree nursing school students who represent the beginning level, end of 1 year, and end of 2 year students, and (b) registered nurses who graduated at least 1 year ago and are working in the study hospital (RN). The nursing school and hospital are located in a northern California county which includes a heterogenous ethnic population.

Data Collection

Faculty at each level of the nursing program were contacted to obtain permission to present the study to their classes. The study was described briefly and volunteers were solicited. Those who volunteered to participate signed and received a copy of the consent form (Appendix A). Volunteers completed the instrument and returned it to the

investigator. The answer sheets were coded with a number indicating the program level. To maintain anonymity, students did not identify themselves on the answer sheets and instructors did not see individual results of students. The answer sheets and instrument were kept locked in the investigator's office until completion of the study when they were destroyed.

The data were collected from registered nurses by contacting the hospital nursing administrator in charge of research proposals. Registered nurses were asked to attend a continuing education session, which was publicized as a part of this research study. Nurses choosing to participate in the research signed the consent and completed the instrument. An educational session on critical thinking in clinical situations followed.

Instrument

Critical thinking ability was measured by the Watson-Glaser Critical Thinking Appraisal (WGCTA) Form A. Permission to conduct the study was received by San Jose State University Human Subjects and Institutional Review Board and the equivalent committees at the associate degree school and hospital. Permission was obtained from the Psychological Corporation to use the WGCTA as the instrument for the study. To maintain the security and integrity of the instrument, the Psychological Corp. requested it not be

bound or reproduced in this study. This instrument includes 80 questions divided into five subscales. The five subscales are: (a) inference, discriminating among degrees of truth or falsity from given data; (b) recognition of assumptions, recognizing unstated assumptions in given statements; (c) deduction, determining if certain conclusions necessarily follow information in given premises; (d) interpretation, weighing evidence and deciding if conclusion based on that data are valid; and (e) evaluation of arguments, distinguishing between arguments that are strong and relevant and those that are weak or irrelevant to the question (Watson & Glaser, 1980). The questions include content related to daily life situations, as well as controversial content which may arouse strong feelings in the subjects.

The instrument demonstrates reliability in (a) predicting success in occupations or training programs, (b) measuring gains in critical thinking from training and instructional programs, and (c) conducting research on critical thinking abilities (Watson & Glaser, 1980). The WGCTA has established validity in evaluating the five aspects of ability to think critically measured by the subscales: inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (Watson & Glaser, 1980). The degree of internal consistency in the

WGCTA was measured by calculating split-half reliability coefficients. Coefficients obtained were corrected for test length using Spearman-Brown formula. Split-half reliability coefficients were calculated for ten of the WGCTA norm groups. The coefficients for these groups range from .69 to .85 (Watson & Glaser, 1980). Stability of responses to WGCTA over time was assessed by administering it twice to a group of college students. The correlation between responses at the two time periods is .73 (Watson & Glaser, 1980).

The validity of the WGCTA was examined in a number of different settings with test users who had a variety of needs and purposes in mind (Watson & Glaser, 1980). In establishing the test's content validity, it should be noted that there is not general agreement on the definition of critical thinking. However, where the WGCTA measures a sample of specific objectives of an instructional setting, there is an indication of its content validity (Watson & Glaser, 1980). Evidence of the test's validity has been drawn from studies using the revised Forms A and B, as well as earlier WGCTA forms Ym and Zm (Watson & Glaser, 1980). The WGCTA has been shown to relate to various measures of academic achievement and mental ability. The correlations of Form A and B to the Otis-Lemmon Mental Ability Test show relationships ranging from .41 to .70, all of which were statistically significant $p < .05$ (Watson & Glaser, 1980).

Correlations between subscales and total scores on Forms Ym, Zm, A, and B were analyzed on a sample of high school and college students (N = 500). These correlations range from .50 to .79 (Watson & Glaser, 1980).

The instrument Form A has a total of 80 questions. Items 1-16 measure the subject's ability to draw inferences based on sufficient data. Items 17-32 measures the subject's ability to recognize unstated assumptions in given statements. Items 33-48 measures the subject's ability to reason by deduction to a conclusion that necessarily follows a statement. Items 49-64 measures the subject's ability to decide whether certain interpretations can be logically made. Items 65-80 measure the subject's ability to determine whether arguments concerning a series of questions are strong or weak (Watson & Glaser, 1980).

Demographic data were measured by items 1-5 on the student nurse forms (Appendix B) and items 1-9 for the registered nurses (Appendix C). These questions were attached to the answer sheets to obtain their demographic data.

Data Analysis

Data were analyzed with descriptive statistics, means, ranges, and standard deviations for each of the groups. Differences between groups were measured by t tests. These analyses are designed to test differences in scores between

students in various levels of nursing education and between nursing students and registered nurses.

Limitations

The study was limited by the sample, setting, and design. The sample was small and consisted of all volunteers who may not be representative of all student nurses or registered nurses. The setting was only one site for the student nurses and only one hospital for the registered nurses. Results may be different at other schools and geographic locations. The design was a cross-sectional, descriptive study which does not show a cause and effect relationship. This design is not as strong or powerful as a longitudinal study. Due to these limitations, the findings should be generalized to the population with caution.

Chapter 4

ANALYSIS AND INTERPRETATION OF DATA

Analysis

This study aimed to describe differences in critical thinking abilities among nursing students at different levels of their education and registered nurses. In addition it describes the demographic variables of each sample group.

Table 1 describes the demographic variables of the entire sample (N =117) with regard to gender, age, ethnicity, and primary language spoken. The majority of volunteers were female (87.2%), aged 36-40 (29.9%) or 31-35 (24.7%). Most volunteers were Caucasian (69.2%) and spoke English as their primary language (79.5%). The volunteers are also shown by level of student education or as a registered nurse, with most being students who have completed 2 years (27.4%).

Table 2 shows the demographic variables of the entering nursing students (n =29). The majority of volunteers were female (75.9%), age categories 26-30 (34.4%) or 31-35 (17.3%), 36-40 (17.3%), or 41-45 (17.3%). Their mean age was 34.5 years. Most of the volunteers were Caucasian (75.9%) and spoke English as their primary language (89.7%).

Table 1

Demographic Data of Entire Sample (N=117)

	n	%
Gender		
Male	15	12.8
Female	102	87.2
Total	117	100.0
Age		
Under 25 years	10	8.5
26-30	20	17.0
31-35	29	24.7
36-40	35	29.9
41-45	18	15.4
Over 45	5	4.3
Total	117	99.8
Ethnicity		
Caucasian	81	69.2
African American	6	5.1
Hispanic	7	6.0
Asian	3	2.6
Filipino	12	10.3
Other	8	6.8
Total	117	100.0
Primary Language		
English	93	79.5
Other	24	20.5
Total	117	100.0
Education Level of Students and Registered Nurses		
Entering student	29	24.8
1 year student	28	23.9
2 year student	32	27.4
Registered Nurse	28	23.9
Total	117	100.0

Note. Percentage totals may not add to 100% due to rounding.

Table 2

Demographic Data of Entering Nursing Students (n=29)

	n	%
Gender		
Male	7	24.1
Female	22	75.9
Total	29	100.0
Age		
Under 25	2	6.8
26-30	10	34.4
31-35	5	17.3
36-40	5	17.3
41-45	5	17.3
over 45	2	6.8
Total	29	99.9
Ethnicity		
Caucasian	22	75.9
African American	2	6.9
Filipino	3	10.3
Hispanic	2	6.9
Total	29	100.0
Primary Language		
English	26	89.7
Other	3	10.3
Total	29	100.0

Note. Mean age = 34.5 years, SD = 7.7.
Percentage totals may not add to 100% due to rounding.

Table 3

Demographic Data of 1 Year Nursing Students (n=28)

	n	%
Gender		
Male	4	14.3
Female	24	85.7
Total	28	100.0
Age		
Under 25 years	7	25.0
26-30	4	14.2
31-35	4	14.2
36-40	8	28.6
41-45	5	17.8
Total	28	99.8
Ethnicity		
Caucasian	19	67.8
African American	2	7.1
Asian	1	3.6
Filipino	5	17.9
Other	1	3.6
Total	28	100.0
Primary Language		
English	20	71.4
Other	8	28.6
Total	28	100.0

Note. Mean age = 33.1 years, SD = 7.5.
Percentage totals may not add to 100% due to rounding.

Table 3 shows demographic variables of the nursing students who completed 1 year of nursing education (n=28). The majority of volunteers were female (85.7%), aged 36-40 (28.6%) or under 25 (25%). Their mean age was 33.1 years.

Table 4

Demographic Data 2 Year Nursing Students (n=32)

	n	%
Gender		
Male	3	9.4
Female	29	90.6
Total	32	100.0
Age		
Under 25 years	1	3.2
26-30	6	18.8
31-35	13	40.6
36-40	8	25.0
41-45	2	6.2
Over 45	2	6.2
Total	32	100.0
Ethnicity		
Caucasian	21	65.6
Filipino	3	9.4
Hispanic	3	9.4
Other	5	15.6
Total	32	100.0
Primary Language		
English	23	71.9
Other	9	28.1
Total	32	100.0

Note. Mean age = 34.6, SD = 5.6.

Most of the volunteers were Caucasian (67.8%) and spoke English as their primary language (71.4%).

Table 4 shows demographic variables of the nursing students who completed 2 years of nursing education (n=32). The majority of volunteers were female (90.6%), aged 31-35 (40.6%) or 36-40 (25%). Their mean age was 34.6 years. Most of the volunteers were Caucasian (65.6%) and spoke English

as their primary language (71.9%).

Table 5 describes the demographic variables of the registered nurses (n=28). The majority of volunteers were female (96.4%), aged 36-40 (50.0%) or 31-35 (25.0%). Their mean age was 38.9 years. Most of the volunteers were Caucasian (67.9%) and spoke English as their primary language (85.7%).

Table 6 demonstrates that the majority of nurses graduated 16-20 years prior to this study (32.1%) or 1-5 years prior (28.5%). The mean of the years since graduation was 12.2. Similarly the majority of nurses have practiced 16-20 years (28.5%) or 1-5 years (28.5%). The mean of the years practiced was 12.1. The table also displays the programs registered nurses originally attended, the majority being associate degree graduates (60.7%). The majority now have earned a baccalaureate degree (46.4%) or remain as an associate degree graduate (42.8%).

Table 7 describes the critical thinking subscale scores for each group. The five subscale tests of the WGCTA are: (a) inference, discriminating among degrees of truth or falsity drawn from given data; (b) recognition of assumptions, recognizing unstated assumptions or presuppositions in given statements or assertions; (c) deduction, determining whether certain conclusions necessarily follow from information in given statements or

premises; (d) interpretation, weighing evidence and deciding if generalizations or conclusions based on the given data are warranted; and (e) evaluation of arguments,

Table 5

Demographic Data of Registered Nurses (n=28)

	n	%
Gender		
Male	1	3.6
Female	27	96.4
Total	28	100.0
Age		
Under 25 years	0	0.0
26-30	0	0.0
31-35	7	25.0
36-40	14	50.0
41-45	6	21.4
Over 45	1	3.5
Total	28	99.9
Ethnicity		
Caucasian	19	67.9
African American	2	7.1
Asian	2	7.1
Filipino	1	3.6
Hispanic	2	7.1
Other	2	7.1
Total	28	100.0
Primary Language		
English	24	85.7
Other	4	14.3
Total	28	100.0

Note. Mean age = 38.9 years, SD = 4.4.
Percentage totals may not add to 100% due to rounding.

Table 6

Registered Nurses' Educational and Practice Data

	n	%
Years since Graduation		
1-5	8	28.5
6-10	4	14.3
11-15	4	14.3
16-20	9	32.1
21-25	2	7.1
Over 25	1	3.5
Total	28	99.8
Years of Nursing Practice		
1-5 years	8	28.5
6-10	4	14.3
11-15	5	17.8
16-20	8	28.5
21-25	2	7.1
Over 26	1	3.5
Total	28	99.9
Program Originally Attended		
Associate Degree	17	60.7
Diploma	2	7.1
Baccalaureate	9	32.1
Total	28	100.0
Highest Degree Earned		
Associate Degree	12	42.8
Diploma	1	3.5
Baccalaureate	13	46.4
Masters	2	7.1
Doctorate	0	0.0
Total	28	99.8

Note. Mean years since graduation = 12.2, SD = 7.6.
Mean years of practice = 12.1, SD = 7.6.
Percentage total may not add to 100% due to rounding.

distinguishing between arguments that are strong and relevant and those that are weak or irrelevant to a particular question at issue (Watson & Glaser, 1980).

Entering students scored highest on interpretation, ($\underline{M}$=11.8) and lowest on inference, ($\underline{M}$=8.1). Students at the end of 1 year of nursing education scored highest on interpretation, ($\underline{M}$=11.7) and lowest on inference, ($\underline{M}$=8.8). Students at the end of 2 years of nursing education scored highest on evaluation of arguments, ($\underline{M}$=11.6) and lowest on inference, ($\underline{M}$=8.4). The registered nurses scored highest on recognition of assumptions, ($\underline{M}$=13.1) and lowest on inference, ($\underline{M}$=9.6).

Table 8 describes the total critical thinking scores of each group. The entering nursing students scored the lowest ($\underline{M}$=52.3) and the registered nurses scored the highest ($\underline{M}$=58.7). The Watson-Glaser Critical Thinking Appraisal Manual gave norms from which percentile scores were based; student norms were used for student groups and professional norms were used for the registered nurses. The entering students were lowest (52nd percentile), followed by first year students (53rd percentile), and the second year students were higher (54th percentile). Registered nurses were the highest of any group (62nd percentile).

Table 7

Critical Thinking Subscale Scores (N=117)

	Test 1 Inference		Test 2 Assumption		Test 3 Deduction		Test 4 Interpretation		Test 5 Evaluation	
	M	SD	M	SD	M	SD	M	SD	M	SD
Entering Student	8.1	2.8	11.2	3.6	9.7	2.8	11.8	2.0	11.5	3.2
1 Year Student	8.8	3.5	10.8	3.3	10.9	2.9	11.7	2.0	11.3	2.9
2 Year Student	8.4	2.4	11.5	2.9	10.7	2.8	11.6	2.2	11.6	2.1
Registered Nurse	9.6	2.6	13.1	2.6	11.4	2.3	12.4	2.5	12.2	2.2

Table 8

Critical Thinking Total Scores (N=117)

	M	SD	Range	%tile
Entering Student	52.3	10.3	35-71	52
1 Year Student	53.4	10.8	36-78	53
2 Year Student	53.9	7.6	42-69	54
Registered Nurse	58.7	10.3	24-78	62

Note. Maximum WGCTA score = 80. Norms from Watson-Glaser Critical Thinking Manual (Watson & Glaser, 1980).

Table 9

Differences Between Group Means for Critical Thinking Total Scores

	n	M	SD	df	t	p
Entering Student	29	52.3	10.3	55	.37	.710
1 Year Student	28	53.4	10.8			
1 Year Student	28	53.4	10.8	58	.61	.547
2 Year Student	32	53.9	7.6			
1 Year Student	28	53.4	10.8	54	1.88	.033*
Registered Nurse	28	58.7	10.4			
Entering Student	29	52.3	10.3	59	.20	.840
2 Year Student	32	53.9	7.6			
2 Year Student	32	53.9	7.6	58	2.75	.015*
Registered Nurse	28	58.7	10.4			
Entering Student	29	52.3	10.3	55	2.32	.024*
Registered Nurse	28	58.7	10.4			

Note. * Significant at $p < .05$.

Table 9 describes the differences between group means on total critical thinking scores using *t*-tests. A statistically significant difference in mean total scores was found between (a) students at the end of 2 years and registered nurse ($t = 2.75$, $p = .015$), (b) entering students and registered nurses ($t = 2.32$, $p = .024$), and (c) students at the end of 1 year and registered nurses ($t = 1.88$, $p = .033$). No other group mean differences were statistically significant.

Interpretation

The mean scores show differences between the entering student group and the end of 1 year student group, as well as between the end of 1 year student group and the end of 2 year student group. However, these differences in scores were not statistically significant. There is a larger difference in mean scores between the 2 year student group and the registered nurses. There were statistically significant differences in mean test scores between the registered nurse group and each group of nursing students.

Subscale scores for all groups were the lowest on inference. The entering and end of 1 year students scored highest on interpretation, while the end of 2 year students scored highest on evaluation of arguments. Registered nurses scored highest on recognition of assumptions.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

The purpose of the study was to describe the critical thinking abilities among nursing students at various levels of their education and among registered nurses in current practice. The study also examined the differences in critical thinking abilities among these groups. Research questions identified levels of students' thinking abilities, differences at various educational levels, and differences in abilities between student groups and registered nurses. The critical thinking theory provided the conceptual framework for this study. The design was descriptive using a standardized critical thinking test, the Watson-Glaser Critical Thinking Appraisal, and a demographic instrument as measurement. The sample population consisted of nursing students in an associate degree program and registered nurses in current practice (N =117).

Findings in this study reveal that there were statistically significant differences in mean critical thinking scores between registered nurses and all student groups. There were increases in mean critical thinking scores between student groups entering to those completing 2 years, but the differences did not reach statistical significance.

Conclusions

Findings in this study parallel literature review findings. Bauwens and Gerhard (1987) used the WGCTA to test critical thinking abilities in a baccalaureate nursing program. Similarly, they demonstrated increases in abilities from first semester to the last semester, but no statistically significant differences in critical thinking scores among the groups were found.

Brigham (1989) tested four levels of a baccalaureate nursing program using the WGCTA. She also found no statistically significant differences among the four group levels in critical thinking abilities.

In contrast to this study's findings, Kokinda (1989) studied four levels of students in baccalaureate nursing education and did find statistically significant differences in their critical thinking abilities. Gross, Takazaua, and Rose (1987) used the WGCTA to test nursing students entering associate degree and baccalaureate nursing programs. They retested the students when they left the two programs and found statistically significant differences in both groups' critical thinking abilities.

The positive differences in critical thinking abilities in the students from one level to the next is encouraging even though they are not statistically significant differences. At least the students are not decreasing in

their critical thinking abilities. It is also interesting that the highest score in critical thinking was in the registered nurse group.

Although the Watson-Glaser Critical Thinking Appraisal is considered a valid and reliable test of critical thinking ability, it is not specific to nursing. The instrument does not test the unique decision making that nurses make in practice. This pen and paper test assesses critical thinking in a general sense.

Many volunteers commented that the test was much more difficult than they had anticipated. They remarked about how demanding the test was and how it had made them think. These comments were consistant from all groups. Some of the volunteers asked how this general critical thinking assessment related to nursing clinical decision making.

It is interesting that the difference between the scores of the entering students and the 1 year students is larger than the difference between the scores of 1 year students and the 2 year students. Could the second year students have been more focused on the preceptorship they were about to be entering? Perhaps they were too busy writing employment applications and preparing for job interviews in a very tight job market. Others in this group took the test soon after their final exam which might account for their decreased focus and burned-out feelings.

Some were already focusing on the upcoming NCLEX examination, which could contribute to increased anxiety levels and decreased critical thinking abilities.

Another concern about the findings of this study is that all the groups scored lowest on the inference subscale. Perhaps this section was more difficult because it had 5 possible responses; all other subscales had only 2 possible responses. Perhaps these groups all have decreased ability to discriminate among the truth or falsity of inferences in data.

The entering and 1 year student groups both scored highest on the subscale, interpretation. These groups appear to come prepared with critical thinking skills in the area of weighing evidence and deciding if generalizations based on data are correct. This should be a sound thinking skill to possess for clinical nursing decision making. The end of 2 year group were highest in the subscale evaluation of argument, indicating their ability to distinguish between arguments that are strong and relevant and those that are weak and irrelevant. This increase in skill may relate to curricular design in the program or increased focus on test taking skills for upcoming NCLEX.

Another interesting result is the registered nurses' highest subscale score was on recognition of assumptions. This indicates their advanced skills in recognizing unstated

assumptions in given statements or circumstances. These situations frequently occur in nursing practice.

Recommendations for Future Research

The population of this study appears to be a representative sample of students in associate degree programs; however, generalization is limited due to the exclusion of students in other types of nursing education and other geographical locations. Therefore, the study should be repeated in other schools of nursing and in other geographical locations.

The time of year may have some influence on the scores of nursing students. Contacting instructors to obtain permission to test their class at the beginning of the semester may be more appropriate and demonstrate different results and responses of the participants, possibly decreasing some variables related to end of the semester burn out and test anxiety.

Also, the setting of the registered nurses' participation could influence their results. Several were participating after working 8 hours on a night shift and attending a mandatory staff meeting.

Finally, the design of the study does not lend itself to revealing at what point in time there may be significant gains in critical thinking in nursing practice. It could be beneficial to conduct a longitudinal study of a large sample

each year during nursing education and each year while in nursing practice.

Recommendations for Nursing Educators

This study suggests several methods to improve measurement of critical thinking abilities. First, present definitions of critical thinking are broad and vague. Educators need to arrive at some consensus regarding the definition of critical thinking. This might eliminate confusion regarding measurement of critical thinking and strengthen strategies to improve critical thinking.

Perhaps an improved, concise definition could direct schools in using critical thinking scores for screening and advisement of students to increase success in nursing education. These could also aid in defining necessary elements of critical thinking related to clinical decision making, which may improve nursing care.

Nursing educators need to develop a method of evaluating teaching strategies designed to increase critical thinking. If an effective measuring device, specific to nursing were developed, strategies could be more easily evaluated and modified.

Summary

Measurement of critical thinking scores is attainable for nursing students and registered nurses. The development of specific measurements related to critical thinking in

nursing practice is hindered by the lack of a precise definition and an instrument to measure critical thinking abilities. The findings of this study have implications for nursing education, nursing research, and the quality of nursing care. The choice remains with each nursing educator whether to continue with old strategies of teaching nursing or to start to measure and improve critical thinking through nursing education.

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Appendix A

Aggreement to Participate

in Research

AGREEMENT TO PARTICIPATE IN RESEARCH

Responsible Investigator: Nancy D. Bingaman, R. N.
Title of Protocol: A descriptive study of nursing students'and graduate nurses' critical thinking abilities.

1. I have been asked to participate in a research study investigating the critical thinking abilities of student nurses and graduate nurses.

2. I will be asked to complete the Watson-Glaser Critical Thinking Appraisal at San Jose State University or other participating institution.

3. There are no reasonably foreseeable risks or discomforts to the subjects in completing the assessment.

4. Neither I nor others will receive specific benefits for my participation in this study. However, the research results may benefit nursing education or practice in general.

5. The alternative procedure available to me is to answer the questions in person with the graduate student investigator.

6. The results of this study may be published, but all participates will be coded and no information published will identify me individually.

7. Neither I nor my institution will be compensated for participation in this study.

8. Any questions about the research may be addressed to Nancy Bingaman, R.N., principal investigator, at (408) 646-4258 or (408) 484-2765. Complaints about the research may be directed to the graduate coordinator, Bobbye Gorenberg, R.N., D.N.Sc.(408) 924-3134. Questions or complaints about research, subjects' rights, or research-related injury may be presented to Serena Stanford, Ph.D., Associate Vice President of Graduate Studies and Research, at (408) 924-2480.

9. If I decide to not participate in the study, no service of any kind, to which I might otherwise be entitled will be lost or jeopardized.

10. My consent is given voluntarily, without being coerced. I may refuse to participate in any part or all of this study and I may withdraw at any time without prejudice to my relations with San Jose State University or any other participating institutions.

11. I have received a signed and dated copy of this consent form.

* The signature of a subject on this document indicates agreement to participate in the study.

* The signature of a researcher on this document indicates agreement to include the above named subject in the research and attestation that the subject has been fully informed of his or her rights.

_____ _____

Subject's Signature Date

_____ _____

Investigator's Signature Date

Appendix B

Demographic Data

for

Nursing Students

Demographic Data for Nursing Students

Please circle the appropriate number:

Gender 1 Female

2 Male

Level 1 Entering student

2 One year student

3 Two year student

Ethniticity 1 Caucasian

2 African American

3 Asian

4 Filipino

5 Hispanic

6 Other

Primary Language

1 English

2 Other

Year of Birth_____

Appendix C

Demographic Data

for

Registered Nurses

Demographic Data for Registered Nurses

Please circle the appropriate number:

Gender 1 Female

2 Male

Ethnicity 1 Caucasian

2 African American

3 Asian

4 Filipino

5 Hispanic

6 Other

Primary Language

1 English

2 Other

Year of Birth_____

Type of Nursing Program Attended

1 Associate Degree

2 Diploma Program

3 Baccalaureate Degree

Highest Degree now held

1 Associate Degree

2 Diploma

3 Baccalaureate Degree

4 Masters Degree

5 Doctoral Degree

Years since graduation_____

Years practiced as a Registered Nurse_____

Area currently working in_____